

What is claimed is:

1. An antimicrobial, synthetic, polymeric, medical device comprising a device surface defining a surface-air interface and having at least one active agent molecularly dispersed, preferentially within the surface, and having a concentration gradient wherein a maximum concentration of the at least one active agent is present at or adjacent to the surface-air interface and wherein the concentration of the at least one active agent within the device decreases with the distance from the surface-air interface, such that in the biologic environment the at least one active agent is released in accordance with a controlled release profile, initially displaying essentially first-order kinetics and subsequently displaying essentially zero-order kinetics.
2. An antimicrobial, synthetic, polymeric medical device as set forth in claim 1 in the form of continuous-wall, flexible catheters formed of a polymer selected from the group consisting of segmented polyether ester, segmented polyether amide, segmented polyether urethane, polyethylene and a polysiloxane copolymer.
3. An antimicrobial synthetic, polymeric medical device as set forth in claim 1 in the form of a non-absorbable monofilament suture formed from a polymer selected from the group consisting of Nylon 6, segmented polyether ester, segmented polyether amide, and polypropylene.
4. An antimicrobial synthetic, polymeric, medical device as set forth in claim 1 in the form of non-absorbable braided sutures formed from a polymer selected from the group consisting of Nylon 66, Nylon 610, and polyethylene terephthalate.

5. An antimicrobial synthetic, polymeric, medical device as set forth in claim 1 in the form of a non-absorbable woven or knitted mesh formed from at least one polymer selected from the group consisting of polypropylene, polyethylene terephthalate, and polytetramethylene terephthalate.
6. An antimicrobial synthetic, polymeric, medical device as set forth in claim 1 in the form of a non-absorbable woven or knitted vascular construct formed from at least one polymer selected from the group consisting of polypropylene, polyethylene terephthalate, and polytetramethylene terephthalate.
7. An antimicrobial synthetic, polymeric, medical device as set forth in claim 1 in the form of absorbable monofilament and multifilament braided sutures made from a polymer comprising repeat units derived from at least one monomer selected from the group consisting of glycolide, l-lactide, dl-lactide, p-dioxanone, ϵ -caprolactone, trimethylene carbonate, 1,5-dioxepan-2-one, and 1,4-morpholine-2-one.
8. An antimicrobial synthetic, polymeric, medical device as set forth in claim 1 in the form of a partially absorbable composite woven or knitted mesh wherein the non-absorbable component is formed from a non-absorbable polymer selected from the group consisting of polypropylene and polyethylene terephthalate and the absorbable component is formed from an absorbable polymer comprising repeat units derived from at least one monomer selected from the group consisting of glycolide, l-lactide, dl-lactide, p-dioxanone, ϵ -caprolactone, trimethylene carbonate, 1,5-dioxepan-2-one, and 1,4-morpholine-2-one.

9. An antimicrobial synthetic, polymeric, medical device as set forth in claim 8 wherein the absorbable component comprises non-woven fabric comprising electrostatically spun nano-/microfibers.
10. An antimicrobial synthetic, polymeric, medical device as set forth in claim 1 in the form of a composite vascular construct comprising a blood-contacting, surface modified, non-absorbable component comprising woven or knitted polypropylene or polyethylene terephthalate yarn and a tissue contacting absorbable component comprising non-woven fabric comprising electrostatically nano-/microfibers made of a segmented copolyester or polyether-ester comprising repeat units derived from at least one cyclic monomer selected from the group consisting of glycolide, l-lactide, dl-lactide, p-dioxanone, ϵ -caprolactone, trimethylene carbonate, 1,5-dioxepan-2-one, and 1,4-morpholine-2-one.
11. An antimicrobial synthetic, polymeric, medical device as set forth in claim 1 comprising 0.005 to 0.5 percent of an antimicrobial agent selected from the group consisting of triclosan sodium, benzalkonium chloride, a chlorhexidine salt, norfloxacin, and triclocarban.
12. An antimicrobial, synthetic, polymeric medical device as set forth in claim 1 in the form of knitted, woven, or composite, partially absorbable mesh.
13. An antimicrobial, synthetic, polymeric medical device as set forth in claim 1 in the form of a surgical monofilament or braided suture.

14. An antimicrobial, synthetic, polymeric medical device as set forth in claim 1 in the form of a twisted multifilament yarn.
15. An antimicrobial, synthetic, polymeric medical device as set forth in claim 1 in the form of non-absorbable monofilament or braided suture comprising at least one bioactive agent selected from the group consisting of triclosan sodium, triclocarban and norfloxacin.
16. An antimicrobial, synthetic, polymeric medical device as set forth in claim 1 capable of the sustained release of the at least one active agent for at least one week.